

Men go great lengths to sustain their respective theories. It is not also to be borne in mind that gneiss often exhibits a higher degree of crystalline structure than granite, from which it is supposed to be produced; and again, this material often alternates with hornblende slate, mica slate, and other compounds. It alternates with granite in the Keesengeberge and in Quin, and in some cases graduates into the character of granite, as on the southern declivity of the Tivis and Jungfrau; more frequently it exchanges both with mica schist, hornblende schist, and granular limestone and clay slate.

In some of these formations we have evidence of periodical depositions such as now take place within the ocean, every successive bed marking its origin and the primary cause of that origin. The bed of gneiss alternates with mica schist, the continuous deposits of the ocean are interrupted or united for a short period with the deposition of suspension (or drift) in this position, and Nature resumes her undisturbed process. Thus, year after year, the bed increases in thickness over a limited region, the sedimentary matter, singly or conjointly produced, covering in the inequalities of the ocean bed on which they repose, varying in thickness and presenting the like extraordinary curvatures throughout their whole thickness.

It is this sedimentary deposition simultaneously taking place with the chemical and mechanical increase of limestone and calcareous beds, that renders the latter so remarkably local and irregular in their occurrence, giving them the form of large lenticular masses, common to the Pyrenees, and enveloped on every side by the predominant rocks of gneiss. By the substitution of hornblende for mica, gneiss gradually changes to hornblende schist, the latter being of pure oceanic character, the former being of mixed nature, of the ocean and river deposits. The numerous transitions of gneiss into other rock, is proof sufficient that its origin is in common with all other kinds, and deducible from the like causes still existing.

Mica schist is a species of gneiss not readily distinguishable from the latter, and, in fact, no real distinction can be made other than that presented by chemical analysis or where the preponderance of mica gives it a marked character. These kinds of rock are almost unknown in England, but in Ireland and Scotland they are abundant, and abound among them many gradations. Gneiss is often found porphyritic at Uart; kaolin is derived from it in the mainland of Zealand, and in Fælar. It forms the beautiful and picturesque region around Loch Sunart.

Granite rocks, including gneiss, are formed by the slow operation of natural causes, a degree of heat far greater than that belonging to the temperate regions of earth being necessary to produce them; the equable distribution of many of the true granites and of gneiss, proves their common origin, and the true mathematical and mechanical combination existing primarily in the organic form. A bed of shell-fish, a bed of sands and shell-fish, a bed of sands, shell-fish, and animal and vegetable matter, of dry land, or the commingled particles of shell-fish and marine exuviae united in the like uniform manner, each of them is a type of the rock in its crystalline state, the ultimate result being the highest of a series of changes, and the after changes depending upon the accidents of time and circumstance, for all kinds of rock however durable their qualities may be, are liable to corrode and decompose as they become exposed to atmospheric action, or to mechanical action produced by winds, rains, &c.

Men are taught that the crystalline rocks are produced by the heat of fusion, but the facts collected in the present day have weakened, and must ere long banish, notions so erroneous and contradictory in their nature. It is true that the material of lavas is analogous to that of granites, and naturally so, for the beds of the earth from which the one and the other are produced simulate in their nature, and boast one common origin; the earths of which they are formed composing the interior and exterior beds being acted upon by flood or fire as accident may determine, for there is no one prescribed rule applicable to natural operations. The ancient and modern lavas are all distinguishable in the present day, and the older streams rapidly decompose

as they become exposed to atmospheric influences.

Common gneiss, used for laying the beds of large furnaces, is found in most of the mountainous parts of Europe in innumerable varieties of proportion, combination, distinguishing colour, and hardness, being covered with argillaceous slate, sand, or limestone. The celebrated Eddystone Lighthouse is said to be a species of gneiss, having a degree of elasticity, and its present state of preservation is demonstrative of its value for buildings and monuments. A species of gneiss, consisting of quartz, mica, and alumine, makes a very superior whetstone for sharpening scythes and other instruments, and a polishing gneiss found in Norway and Sweden, and composed of alumine and mica, is much used to polish steel instruments. Slatite gneiss, consisting of talcite and mica, is used for the walls of melting furnaces, and for the covering of houses in Sweden, Hungary, &c.

Gneiss is the most metalliferous of all rocks, some of the richest mines in Europe and South America being in this formation, and in this respect also it is its common origin with granite on the one hand, and to common schist or slate on the other, for granite often passes into tinstone and other metalliferous rocks, and the close alliance of both kinds with their beds and veins intersecting them demonstrates evidence of the common origin and contemporaneous formation of both. The like remarks equally apply to the schistose beds comprising so great a portion of the carboniferous series: the continental mines in Saxony and Bohemia, and the silver mines of Koesberg are formed in gneiss.

Gneiss often abounds with garnets, and this species, which is very common to Europe, is also abundant in Upper India, and may be found under a variety of forms and combinations, from the simple conglomerated mass of garnet sands, interspersed with mica, to the most highly finished schistose beds and rocks. The low range of hills near Nagpoor abounds with the most beautiful specimens of crystalline rock, interspersed with blocks of marble, hornblende, and other rich and ornamental stones. Ceylon is also abundantly supplied with this beautiful natural product, which presents a polish throughout its schistose structure utterly unattainable by art. In all countries its close alliance with granite, and its origin from the one common source, are evidenced by the same mechanical combinations of its constituents, the same colour and compound structure, the like divisions into mineral veins and beds, and the like metalline bodies, the observable difference being that some species are composed of the finer particles of matter in which extraneous bodies are irregularly distributed, manifesting periodical deposition as well as local deposition, analogous to the earth forming the delta of Egypt, which, whether undisturbed by the operations of man, exhibits, even in its disintegrated state, a laminated or schistose structure; the other granite, as previously observed, forming, by local deposition of larger aggregates, the intermediate species, showing the transition of the one into the other.

POPHYRY.—A term in mineralogy applied to a large and varied class of rocks falsely termed *primæval* and *volcanic* by modern geologists, and defined as having a compact basis, in which are disposed granular particles, or crystals. This base is generally siliceous, or silico-aluminous, as compact felspar, hornstone, pitchstone, peridot, claystone, or obsidian; the enclosed grains or crystals being quartz or felspar. Of these varieties the pitchstone and peridot porphyries appear to take precedence, in the order of production, over the claystone and other porphyries containing potash and mica in their mechanical composition.

It is a very difficult matter for the practical mineralogist to separate the porphyries from other kinds of rock; for we observe them pass, on the one hand, into granite, gneiss, mica, &c., and on the other, into sandstone, pitchstone, and clay.

(To be continued.)

OPENING OF THE TROLLHATTAN CANAL.—GOTTENBURG, May 11.—It is confidently asserted on the best authority that the king will be present at the opening of the new Trollhattan Canal and Sluices; and that he will arrive here on the 31st instant.

BUILDERS' SOCIETY.

Report of the Committee on the Metropolitan Buildings Bill, as printed by order of the House of Commons, March, 1844.

Your Committee would congratulate the Society on the very much improved character of this Bill, as compared with all those to which your attention has been called, as they have been severally printed by the House of Commons during the last three years, and they cannot but advert with satisfaction to the lucid form and clear arrangement which pervade the Bill as now presented.

To the general intentions and purposes of such an Act, it is quite clear that we, as builders, can offer no possible objection, in so far as it tends to improve the character of buildings generally; nor have we any right, or any disposition, to interfere in the matter further than to bring to bear upon it so much of technical knowledge and personal experience as we may be able to command, for the purpose of pointing out the probable practical effect of the proposed enactments, and thereby assisting the framers of the law to the better carrying out of their own intentions.

The leading features of the present Building Act (14 Geo. 3, c. 78) are of course generally known, it will therefore suffice for the committee to point out the most important points on which the proposed Bill differs from it.

It proposes to repeal the Act 14 Geo. 3, c. 78, except as to that part which relates to dangers by fire.

Also, the 50th Geo. 3, c. 75, which is an Act to legalize the use of patent tesserae as roofing.

Also, the 3rd and 4th Will. 4, c. 35, and 3rd and 4th Vic. c. 85 (both known as Chimney Sweepers Acts), so far as they relate to the construction of chimneys.

The limits of its operations are much more extensive, taking at once a circle of about eight miles round the metropolis; but as there is a provision for its further extension to twelve miles from Charing-cross, it is most probable that the rapidly increasing size of the metropolis soon will render it desirable that this extent should come under its control.

District surveyors are to be continued in office, their duties being similar to those at present imposed upon them—their numbers being necessarily increased. All public buildings, however, and all private dwellings or warehouses beyond certain limits are to be under the control of a new body of officers styled official referees; and to consist of two architects and a registrar; the duty of this latter officer being to judge of the legality of all matters connected with this Act; and, as his name implies, to keep a register of all transactions connected therewith. The official referees are further to be a court of appeal, with power to settle all questions of disputed rights, value of works, or any other matter that may arise in relation to this Act. From this court of second instance, however, there is to be an appeal to the Commissioners of Woods and Works, who have full power of decision in such cases as may be brought before them.

Your committee feels that this arrangement of official referees promises fair to constitute a ready and competent tribunal for the adjustment of differences relating to questions of building; not only as to the points touched by the proposed Bill, but as to all such questions whatever; an important benefit to the public, and to our trade especially, which, from its intricacy of detail and abundance of technicalities, offers so many difficulties to the real investigation of the differences which arise in reference to it, and renders a peculiar professional education imperative for the right understanding of them.

It appears, however, that the amount of work which will necessarily devolve on the official referees will render it desirable that their number should be increased; which will be obvious if you consider the large extent over which their services may be required, and that under the proposed arrangement all moderately large dwelling-houses would require their special supervision.

The official referees are to be appointed by the Secretary of State for the Home Department; the registrar by the Commissioners of Woods and Works.